



MNWAPG/MNWAPGA
Wireless 802.11b/g Access Point

User Manual

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Chapter 1 Introduction

The **MNWAPG/MNWAPGA** is an access point for IEEE 802.11g/b 2.4GHz wireless network. You can use **MNWAPG/MNWAPGA** to build up a wireless LAN. Any wireless LAN station can join the wireless network by using the "Infrastructure Mode".

The **MNWAPG/MNWAPGA** supports WEP, WPA, ESSID and MAC address filter functions to consolidate the wireless network security. With ESSID authentication, 64/128 bit WEP encryption and MAC address filtering you can prevent unauthorized wireless stations from accessing your wireless network.

The **MNWAPG/MNWAPGA**'s dipole antenna is detachable by connecting to a RP-SMA connector. Users can install a high gain antenna to the connector for better network link quality so that you can build wireless network with more flexibility.

MNWAPG/MNWAPGA provides easy to use user interface and allows users to configuring from web browser. Also it integrates DHCP server to provide multiple wireless and wired users to get their IP address automatically. With the versatile of features, this product is the best choice for you to integrate your wireless and wired network seamlessly.

1.1 Package Contents

The Access Point includes the following items:

- One Access Point
- One Power Adapter
- One User's Manual

1.2 Features

- Complies with the IEEE 802.11b/g (DSSS) 2.4GHz specification.
- High data rate 54Mbps network speed.
- Seamlessly integrate wireless and wired Ethernet LAN networks.
- Auto rate fallback in case of obstacles or interferences.
- Provide 64/128-bit WEP and WPA Data Encryption function to protect the wireless data transmissions.
- Built-in DHCP server supports auto IP addresses assignment.
- Supports Web-based configuration.

1.3 Specifications

- Standards: IEEE 802.11b/g (Wireless), IEEE 802.3 (Wired)
- Data Rate: 54/48/36/24/18/12/11/9/6/5.5/2/1Mbps auto fallback
- Security: 64/128-bit WEP and WPA Data Encryption
- Frequency Band: 2.400~2.4835GHz (Industrial Scientific Medical Band)
- Modulation: CCK@11/5.5Mbps, DQPSK@2Mbps and DBPSK@1Mbps
- Radio Technology: Direct Sequence Spread Spectrum (DSSS)
- Antenna: External detachable dipole antenna (with RP-SMA connector)
- Connectors: 10/100Mbps RJ-45 x 1
- Power: 12VDC, 0.5A
- Transmit Power: 15dBm (Typical)
- LEDs: Power, LAN Link/Activity, Wireless Activity
- Dimension: 30(H) x 127(W) x 96(D) mm
- Temperature:
 - Operating: 32~131°F (0~55°C)
 - Storage: -4~158°F(-20~70°C)
- Humidity: 10-90% (Noncondensing)

- Certification: FCC, CE

1.4 Physical Description

Front Panel

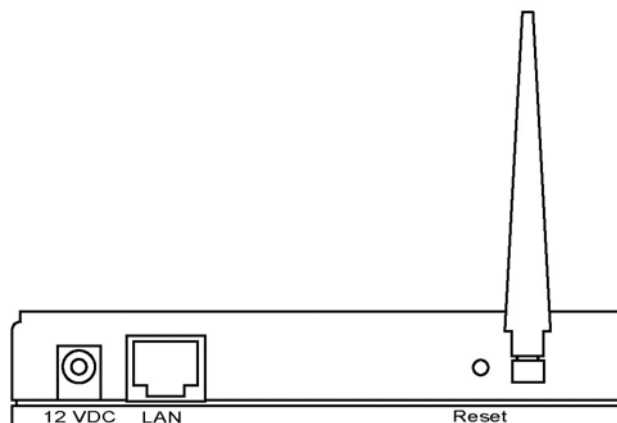
On the Access Point's front panel there are LED lights that inform you of the Access Point's current status. Below is an explanation of each LED.



LED	Color	Status	Description
Power	Green	Lit	Power is supplied.
		Off	No Power.
Wireless Activity	Green	Flash	Antenna is transmitting or receiving data.
		Off	Antenna is not transmitting or receiving data.
LAN Link/Activity	Green	On	A valid link is established.
		Flash	It is transmitting or receiving data.
		Off	No link is established.

Back Panel

Access Point's connection ports are located on the back panel. Below is the description of each connection port.



- **Antenna Connector**

This round connection is standard Reverse SMA connector where any antennas with Reverse SMA connector can connect to the Access Point.

- **DC Adapter Port**

Insert the power jack of the power adapter into this port.

- **LAN Port**

The Access Point's LAN port is where you connect to your LAN's network devices.

- **Reset**

The Reset button allows you to do one of two things.

- 1) If problems occur with your Access Point, press the reset button with a pencil tip (for less than 4 seconds) and the Access Point will re-boot itself, keeping your original configurations.
- 2) If problems persist or you experience extreme problems or you forgot your password, press the reset button for longer than 4 seconds and the Access Point will reset itself to the factory default settings (warning: your original configurations will be replaced with the factory default settings).

Chapter 2 Wireless LAN Access Point Connection

1. Locate an optimum location for the Wireless LAN Access Point.

The best location for your Access Point is usually at the center of your wireless network, with line of sight to all of your mobile stations.

2. Connect the Wireless LAN Access Point to your router, hub or switch.

Connect one end of standard UTP cable to the Access Point's LAN Port and connect the other end of the cable to a switch, a router or a hub. The Access Point will then be connected to your existed wired LAN Network.

3. Connect the DC Power Adapter to the Wireless LAN Access Point's Power Socket.

Only use the power adapter supplied with the Access Point. Using a different adapter may damage the product.

The Hardware Installation is completed.

Chapter 3 Wireless LAN Access Point Configuration

3.1 Getting Started

This Access Point provides web-based configuration tool allowing you to configure from wired or wireless stations. Follow the instructions below to get started configuration.

From Wired Station

1. Make sure your wired station is in the same subnet with the Access Point.

The default IP Address and Sub Mask of the Access Point is:

Default IP Address: 192.168.2.1

Default Subnet: 255.255.255.0

Configure your PC to be in the same subnet with the Access Point.

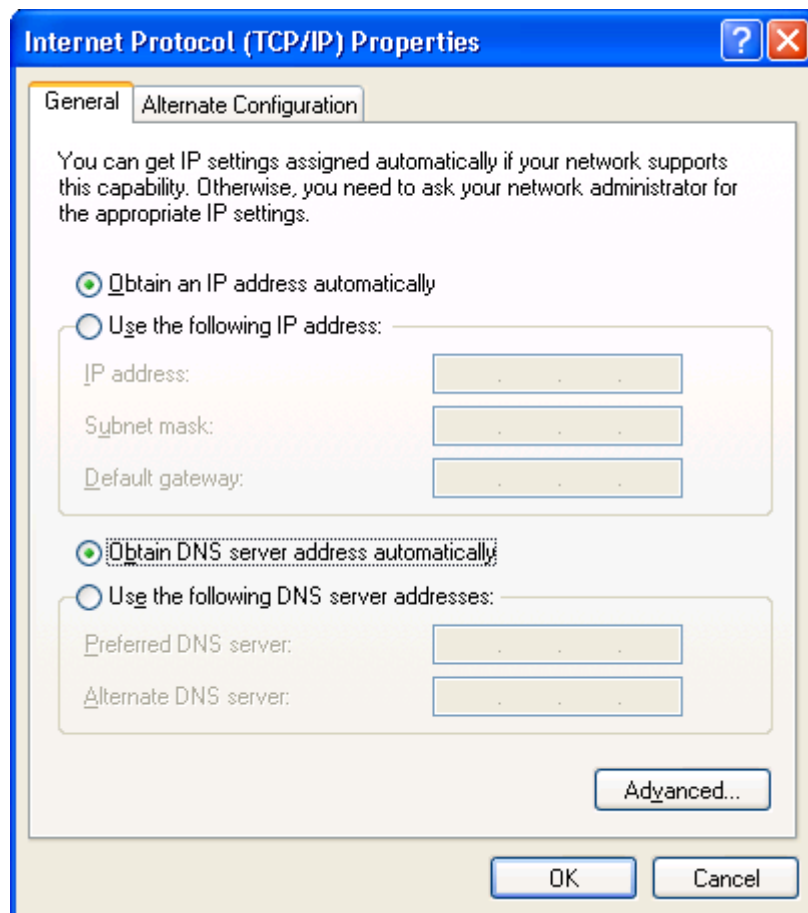
1a) Windows 95/98/Me

1. Click the *Start* button and select *Settings*, then click *Control Panel*. The *Control Panel* window will appear.
2. Double-click *Network* icon. The *Network* window will appear.
3. Check your list of *Network Components*. If TCP/IP is not installed, click the *Add* button to install it now. If TCP/IP is installed, go to **step 6**.
4. In the *Network Component Type* dialog box, select *Protocol* and click *Add* button.
5. In the *Select Network Protocol* dialog box, select *Microsoft and TCP/IP* and then click the *OK* button to start installing the TCP/IP protocol. You may need your Windows CD to complete the installation.
6. After installing TCP/IP, go back to the *Network* dialog box. Select *TCP/IP* from the list of *Network Components* and then click the *Properties* button.
7. Check each of the tabs and verify the following settings:
 - **Bindings:** Check *Client for Microsoft Networks* and *File and printer sharing for Microsoft Networks*.
 - **Gateway:** All fields are blank.
 - **DNS Configuration:** Select *Disable DNS*.
 - **WINS Configuration:** Select *Disable WINS Resolution*.
 - **IP Address:** Select *Specify an IP Address*. Specify the IP Address and Subnet Mask as following example.

- ✓ IP Address: 192.168.2.3 (any IP address within 192.168.2.2~192.168.2.254 is available, **do not setup 192.168.2.1**)
 - ✓ Subnet Mask: 255.255.255.0
8. Reboot the PC. Your PC will now have the IP Address you specified.

1b) Windows XP

- 1: Click the *Start* button and select *Settings*, then click *Network Connections*. The *Network Connections* window will appear.
- 2: Double-click *Local Area Connection* icon. The *Local Area Connection* window will appear.
- 3: Check your list of Network Components. You should see *Internet Protocol [TCP/IP]* on your list. Select it and click the *Properties* button.
- 4: In the Internet Protocol (TCP/IP) Properties window, select *Obtain an IP address automatically* and *Obtain DNS server address automatically* as shown on the following screen.



- 5: Click *OK* to confirm the setting. Your PC will now obtain an IP address automatically

from your Broadband Router's DHCP server.

Note: Please make sure that the Broadband router's DHCP server is the only DHCP server available on your LAN.

Once you've configured your PC to obtain an IP address automatically, please proceed to Step 3.

1c) Windows 2000

1. Click the *Start* button and select *Settings*, then click *Control Panel*. The *Control Panel* window will appear.
2. Double-click *Network and Dial-up Connections* icon. In the *Network and Dial-up Connection* window, double-click *Local Area Connection* icon. The *Local Area Connection* window will appear.
3. In the *Local Area Connection* window, click the *Properties* button.
4. Check your list of *Network Components*. You should see *Internet Protocol [TCP/IP]* on your list. Select it and click the *Properties* button.
5. In the *Internet Protocol (TCP/IP) Properties* window, select *Use the following IP address* and specify the IP Address and Subnet mask as following.
 - ✓ IP Address: 192.168.2.3 (any IP address within 192.168.2.2~192.168.2.254 is available, **do not setup 192.168.2.1**)
 - ✓ Subnet Mask: 255.255.255.0
6. Click *OK* to confirm the setting. Your PC will now have the IP Address you specified.

1d) Windows NT

1. Click the *Start* button and select *Settings*, then click *Control Panel*. The *Control Panel* window will appear.
2. Double-click *Network* icon. The *Network* window will appear. Select the *Protocol* tab from the *Network* window.
3. Check if the *TCP/IP Protocol* is on your list of *Network Protocols*. If *TCP/IP* is not installed, click the *Add* button to install it now. If *TCP/IP* is installed, go to **step 5**.
4. In the *Select Network Protocol* window, select the *TCP/IP Protocol* and click the *Ok* button to start installing the *TCP/IP protocol*. You may need your Windows CD to complete the installation.
5. After you install *TCP/IP*, go back to the *Network* window. Select *TCP/IP* from the list of *Network Protocols* and then click the *Properties* button.
6. Check each of the tabs and verify the following settings:

- **IP Address:** Select *Specify an IP address*. Specify the IP Address and Subnet Mask as following example.
 - ✓ IP Address: 192.168.2.3 (any IP address within 192.168.2.2~192.168.2.254 is available, **do not setup 192.168.2.1**)
 - ✓ Subnet Mask: 255.255.255.0
- **DNS:** Let all fields are blank.
- **WINS:** Let all fields are blank.
- **Routing:** Let all fields are blank.

7. Click *OK* to confirm the setting. Your PC will now have the IP Address you specified.

2. Enter 192.168.2.1 from Web Browser to get into the Access Point's configuration tool.
3. A screen will be popped up and request you to enter user name and password. The default user name and password is as follows.

User Name: Admin

Password: 1234

Enter the default user name and password, then press *OK* button directly.

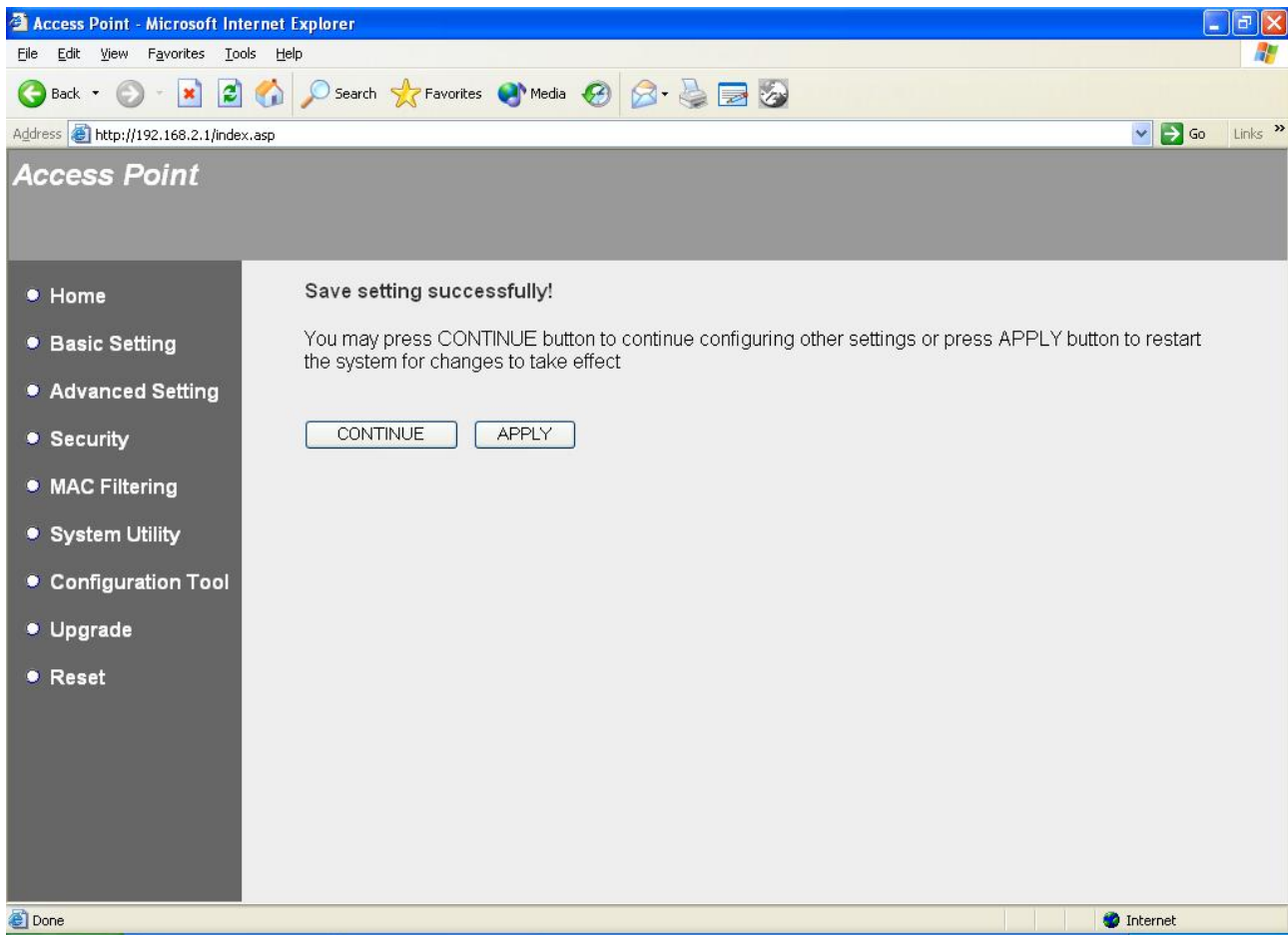


4. You can start configuring the Access Point.

From Wireless Station

1. Make sure your wireless station is in the same subnet with the Access Point. Please refer to the step 1 above for configuring the IP Address and Sub Mask of the wireless station.
2. Connect to the Access Point.
The Access Point's default ESSID is "**default**" and the WEP Encryption function is disabled. Make sure your wireless station is using the same ESSID as the Access Point and associate your wireless station to the Access Point.
3. Enter **192.168.2.1** from Web Browser to get into the Access Point's configuration tool.
4. Enter the user name and password and then press **OK** button and you are available to configure the Access Point now.

3.2 Configuring the Access Point



Every time when you have finished modifying a setting page and click “Apply” button, this page will pop-up. The settings have been successfully saved but will not take effect immediately. You have to restart the access point to make the new settings take effect. You can click “CONTINUE” button to continue other settings. You also can click “APPLY” to restart the system and make the settings take effect.

3.2.1 Status and Information

On this screen, you can see the general information of the Access Point including Alias Name, Firmware Version, ESSID, Channel Number, Status, IP Address, MAC Address, etc.

The screenshot shows a web browser window titled "Access Point - Microsoft Internet Explorer". The address bar displays "http://192.168.2.1/index.asp". The page content is titled "Access Point" and features a sidebar menu on the left with the following items: Home, Basic Setting, Advanced Setting, Security, MAC Filtering, System Utility, Configuration Tool, Upgrade, and Reset. The main content area is titled "Status and Information" and contains the text: "You can use the information to monitor the Access Point's MAC address, runtime code and hardware version." Below this text are three tables: "System", "Wireless Configuration", and "LAN Configuration".

System	
Uptime	0day:0h:48m:40s
Hardware Version	Rev. A
Runtime Code Version	1.15

Wireless Configuration	
Mode	Universal Repeater
ESSID	default
Channel Number	11
Security	Disable
BSSID	00:11:22:33:44:55

LAN Configuration	
IP Address	192.168.2.1
Subnet Mask	255.255.255.0
Default Gateway	0.0.0.0

3.2.2 Wireless Setting

This **MNWAPG/MNWAPGA** supports AP, Station, Bridge, WDS and Universal Repeater modes. “AP Mode” provides pure access point function. The simplest way to build up a wireless LAN is to use “AP Mode”. “Station Mode” is used to let a network device with only wired Ethernet function to have wireless LAN communication capability. It provides both Ad Hoc and Infrastructure modes for the “Station Mode”. With “Station-Ad Hoc mode”, it can let your network device join a wireless LAN with peer-to-peer communication. With “Station-Infrastructure mode”, it can let your network device join a wireless LAN through an access point. “AP Bridge Mode” provides the function to bridge more than 2 wired Ethernet networks together by wireless LAN. You can use two access points with “AP Bridge-Point to Point mode” to bridge two wired Ethernet networks together. If you want to bridge more than two wired Ethernet networks together, you have to use enough access points with “AP Bridge-Point to Multi-Point mode”. An access point with “AP Bridge-Point to Point mode” or “AP Bridge-Point to Multi-Point mode” can only be used to bridge wired Ethernet networks together. It can't accept connection from other wireless station at the same time. If you want an access point to bridge wired Ethernet network and provide connection service for other wireless station at the same time, you have to set the access point to “AP Bridge-WDS mode”. Simply speaking, “AP Bridge-WDS mode” function is the combination of “AP mode” and “AP Bridge-Point to Multi-Point mode”. “Universal Repeater Mode” provides the function to act as AP client and AP at the same time. It can use AP client function to connect to a Root AP and use AP function to service all wireless stations within its coverage. All the stations within the coverage of this access point can be bridged to the Root AP. “Universal Repeater Mode” is very convenient to extend the coverage of your wireless network.

AP mode setting page:

Access Point - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media Mail Print Folders

Address <http://192.168.2.1/index.asp> Go Links

Access Point

- Home
- Basic Setting
- Advanced Setting
- Security
- MAC Filtering
- System Utility
- Configuration Tool
- Upgrade
- Reset

Wireless Setting

This page allows you to define ESSID, and Channel for the wireless connection. These parameters are used for the wireless stations to connect to the Access Point.

Mode :	AP
Band :	2.4 GHz (B+G)
ESSID :	default
Channel Number :	11
Associated Clients :	Show Active Clients

Apply Cancel

Done Internet

Station-Ad Hoc mode setting page:

The screenshot shows a web browser window titled "Access Point - Microsoft Internet Explorer". The address bar displays "http://192.168.2.1/index.asp". The page has a grey header with the title "Access Point". On the left is a navigation menu with the following items: Home, Basic Setting, Advanced Setting, Security, MAC Filtering, System Utility, Configuration Tool, Upgrade, and Reset. The main content area is titled "Wireless Setting" and contains the following text: "This page allows you to define ESSID, and Channel for the wireless connection. These parameters are used for the wireless stations to connect to the Access Point." Below this text are several configuration fields: "Mode" (a dropdown menu set to "Station-Ad Hoc"), "Band" (a dropdown menu set to "2.4 GHz (B+G)"), "ESSID" (a text box containing "default"), "Channel Number" (a dropdown menu set to "11"), "Site Survey" (a button labeled "Select Site Survey"), and "WLAN MAC" (a text box containing "000000000000" and a "Clone MAC" button). At the bottom right of the form are "Apply" and "Cancel" buttons. The browser's status bar at the bottom shows "Done" and "Internet".

Access Point - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media

Address <http://192.168.2.1/index.asp> Go Links

Access Point

- Home
- Basic Setting
- Advanced Setting
- Security
- MAC Filtering
- System Utility
- Configuration Tool
- Upgrade
- Reset

Wireless Setting

This page allows you to define ESSID, and Channel for the wireless connection. These parameters are used for the wireless stations to connect to the Access Point.

Mode :	Station-Ad Hoc
Band :	2.4 GHz (B+G)
ESSID :	default
Channel Number :	11
Site Survey :	Select Site Survey
WLAN MAC :	000000000000 Clone MAC

Apply Cancel

Done Internet

Station-Infrastructure mode setting page:

The screenshot shows a web browser window titled "Access Point - Microsoft Internet Explorer". The address bar displays "http://192.168.2.1/index.asp". The page has a grey header with the text "Access Point". On the left is a dark grey sidebar with a list of menu items: Home, Basic Setting, Advanced Setting, Security, MAC Filtering, System Utility, Configuration Tool, Upgrade, and Reset. The main content area is titled "Wireless Setting" and contains the following text: "This page allows you to define ESSID, and Channel for the wireless connection. These parameters are used for the wireless stations to connect to the Access Point." Below this text are several configuration fields: "Mode" is a dropdown menu set to "Station-Infrastructure"; "Band" is a dropdown menu set to "2.4 GHz (B+G)"; "ESSID" is a text input field containing "default"; "Site Survey" is a button labeled "Select Site Survey"; "WLAN MAC" is a text input field containing "000000000000" next to a "Clone MAC" button. At the bottom right of the form are "Apply" and "Cancel" buttons. The browser's status bar at the bottom shows "Done" and "Internet".

Access Point - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media Print Mail News RSS Feeds

Address <http://192.168.2.1/index.asp> Go Links

Access Point

- Home
- Basic Setting
- Advanced Setting
- Security
- MAC Filtering
- System Utility
- Configuration Tool
- Upgrade
- Reset

Wireless Setting

This page allows you to define ESSID, and Channel for the wireless connection. These parameters are used for the wireless stations to connect to the Access Point.

Mode : Station-Infrastructure

Band : 2.4 GHz (B+G)

ESSID : default

Site Survey : Select Site Survey

WLAN MAC : 000000000000 Clone MAC

Apply Cancel

Done Internet

AP Bridge-Point to Point mode setting page:

The screenshot shows a web browser window titled "Access Point - Microsoft Internet Explorer". The address bar displays "http://192.168.2.1/index.asp". The page has a sidebar menu on the left with the following items: Home, Basic Setting, Advanced Setting, MAC Filtering, System Utility, Configuration Tool, Upgrade, and Reset. The main content area is titled "Wireless Setting" and contains the following text: "This page allows you to define ESSID, and Channel for the wireless connection. These parameters are used for the wireless stations to connect to the Access Point."

The configuration fields are as follows:

- Mode:
- Band:
- Channel Number:
- MAC Address 1:
- Set Security:

At the bottom right of the configuration area, there are two buttons: and .

AP Bridge-Point to Multi-Point mode setting page:

Access Point

- Home
- Basic Setting
- Advanced Setting
- MAC Filtering
- System Utility
- Configuration Tool
- Upgrade
- Reset

Wireless Setting

This page allows you to define ESSID, and Channel for the wireless connection. These parameters are used for the wireless stations to connect to the Access Point.

Mode :	AP Bridge-Point to Multi-Point
Band :	2.4 GHz (B+G)
Channel Number :	11
MAC Address 1 :	000000000000
MAC Address 2 :	000000000000
MAC Address 3 :	000000000000
MAC Address 4 :	000000000000
MAC Address 5 :	000000000000
MAC Address 6 :	000000000000
Set Security :	Set Security

AP Bridge-WDS mode setting page:

The screenshot shows a web browser window titled "Access Point - Microsoft Internet Explorer". The address bar displays "http://192.168.2.1/index.asp". The page has a header "Access Point" and a left sidebar with navigation links: Home, Basic Setting, Advanced Setting, Security, MAC Filtering, System Utility, Configuration Tool, Upgrade, and Reset. The main content area is titled "Wireless Setting" and contains the following fields:

Mode :	AP Bridge-WDS
Band :	2.4 GHz (B+G)
ESSID :	default
Channel Number :	11
Associated Clients :	Show Active Clients
MAC Address 1 :	000000000000
MAC Address 2 :	000000000000
MAC Address 3 :	000000000000
MAC Address 4 :	000000000000
MAC Address 5 :	000000000000
MAC Address 6 :	000000000000

The status bar at the bottom shows "Done" and "Internet".

Universal Repeater mode setting page:

The screenshot shows a web browser window titled "Access Point - Microsoft Internet Explorer" with the address bar displaying "http://192.168.2.1/index.asp". The page has a sidebar menu on the left with options: Home, Basic Setting, Advanced Setting, Security, MAC Filtering, System Utility, Configuration Tool, Upgrade, and Reset. The main content area is titled "Wireless Setting" and contains the following fields and buttons:

- Mode:** A dropdown menu set to "Universal Repeater".
- Band:** A dropdown menu set to "2.4 GHz (B+G)".
- ESSID:** A text input field containing "default".
- Channel Number:** A dropdown menu set to "11".
- Associated Clients:** A button labeled "Show Active Clients".
- Site Survey:** A button labeled "Select Site Survey".
- WLAN MAC:** A text input field containing "000000000000" and a "Clone MAC" button.
- Root AP SSID:** An empty text input field.

At the bottom right of the form are "Apply" and "Cancel" buttons.

Parameter	Description
ESSID	The ESSID (up to 31 printable ASCII characters) is the unique name identified in a WLAN. The ID prevents the unintentional merging of two co-located WLANs. Please make sure that the ESSID of all stations in the same WLAN network are the same. The default ESSID is " default ". You should assign ESSID in "AP mode", "Station-Ad Hoc mode", "Station-Infrastructure mode", "AP Bridge-WDS mode" and "Universal Repeater mode".
Band	It allows you to set the AP fix at 802.11b or 802.11g mode. You also can select B+G mode to allow the AP select 802.11b and 802.11g connection automatically.
Channel Number	Select the appropriate channel from the list provided to correspond with your network settings. Channels differ from country to country. Channel 1-11 (North America)

Channel 1-14 (Japan)

Channel 1-13 (Europe)

There are 14 channels available.

You should assign Channel Number in “AP mode”, “Station-Ad Hoc mode”, “AP Bridge-Point to Point mode”, “AP Bridge-Point to Multi-Point mode” and “AP Bridge-WDS mode”, “Universal Repeater mode”.

MAC Address

If you want to bridge more than one wired Ethernet networks together with wireless LAN, you have to set this access point to “AP Bridge-Point to Point mode”, “AP Bridge-Point to Multi-Point mode” or “AP Bridge-WDS mode”. You have to enter the MAC addresses of other access points that join the bridging work.

WLAN MAC

In “Station-Ad Hoc mode”, “Station-Infrastructure mode” and “Universal Repeater mode”, this device need a WLAN MAC address to act as a station to connect to other peer or access point. You also can click “Clone MAC” button to let this device copy the MAC address of the PC you are using to configure this device.

Root AP SSID

In “Universal Repeater mode”, this device can act as a station to connect to a Root AP. You should assign the SSID of the Root AP here.

Set Security

In “AP Bridge-Point to Point mode”, “AP Bridge-Point to Multi-Point mode” and “AP Bridge-WDS mode”, you can click “Set Security” to add encryption for the communication between the bridged access points. This can protect your wireless network.

Associated Clients

Click “Show Active Clients” button, then an “Active Wireless Client Table” will pop up. You can see the status of all active wireless stations that are connecting to the access point.

Wireless Site Survey

When you use this access point as a wireless station for wired network device to have wireless capability, you have to associate it will an working access point. Click “Select Site Survey” button, then a “Wireless Site Survey Table” will pop up. It will list all available access points near by. You can select one access point in the table and it will join wireless LAN through this access point.

Click **Apply** button at the bottom of the screen to save the above configurations. You can now configure other advance sections or start using the Access Point.

Set Security

“Set Security” let you setup the wireless security for the data transmission between the bridged access points in “AP Bridge-Point to Point mode”, “AP Bridge-Point to Multi-Point mode” or “AP Bridge-WDS mode”. It provides “WEP 64bits”, “WEP 128bits”, “WPA (TKIP)”, “WPA2 (AES)” encryption methods.

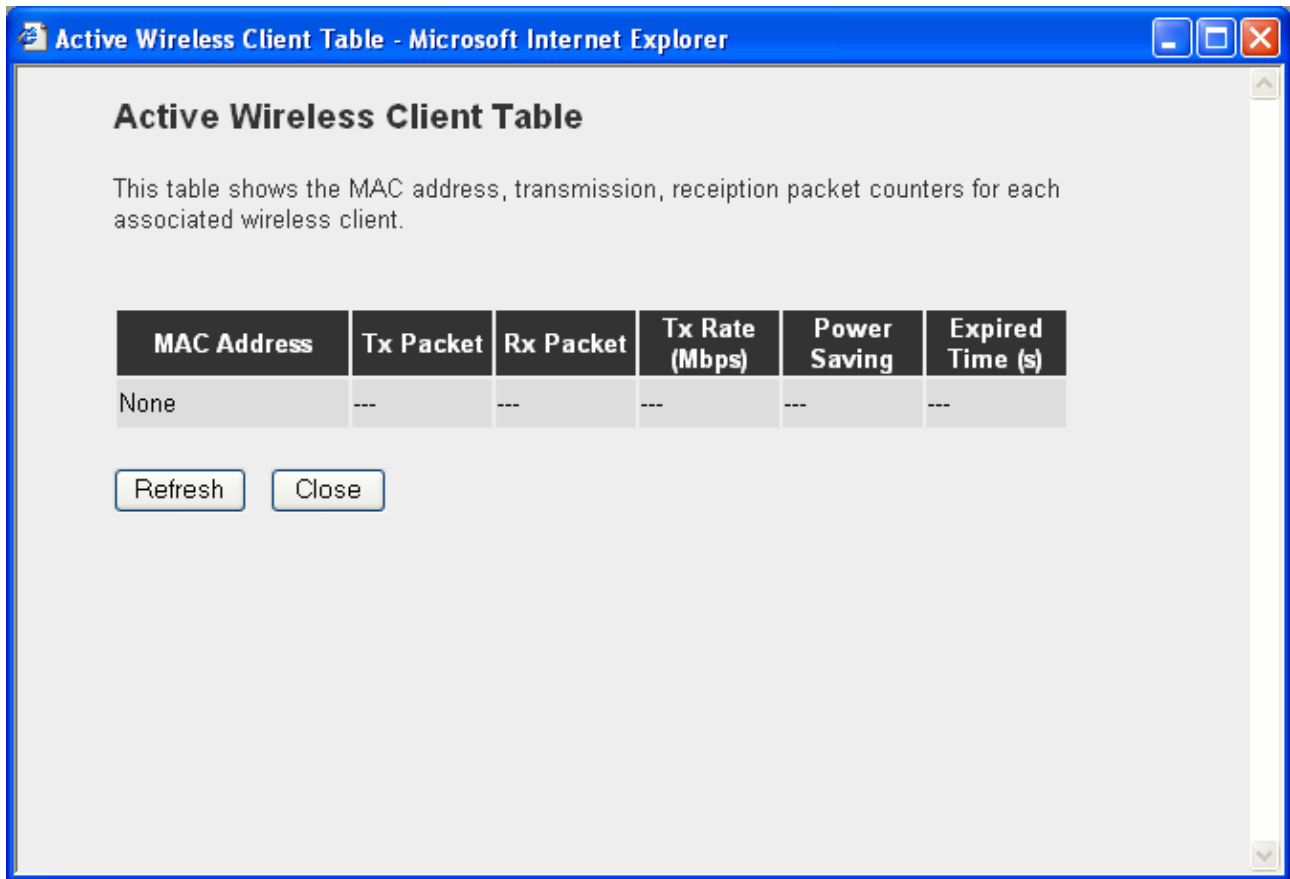
Parameter	Description
Encryption	You can select “No encryption”, “WEP 64bits”, “WEP 128bits”, “WPA (TKIP)” or “WPA2 (AES)” encryption methods.
Key Format	This is only used when you select “WEP 64bits” or “WEP 128bits” encryption method. You may select to select ASCII Characters (alphanumeric format) or Hexadecimal Digits (in the “A-F”, “a-f” and “0-9” range) to be the WEP Key. For example: ASCII Characters: guest Hexadecimal Digits: 12345abcde

WEP Key	This is only used when you select “WEP 64bits” or “WEP 128bits” encryption method. The WEP key is used to encrypt data transmitted between the bridged access points. Fill the text box by following the rules below. 64-bit WEP: input 10-digit Hex values (in the “A-F”, “a-f” and “0-9” range) or 5-digit ASCII character as the encryption keys. 128-bit WEP: input 26-digit Hex values (in the “A-F”, “a-f” and “0-9” range) or 10-digit ASCII characters as the encryption keys.
Pre-shared Key Format	You may select to select Passphrase (alphanumeric format) or Hexadecimal Digits (in the “A-F”, “a-f” and “0-9” range) to be the Pre-shared Key. For example: Passphrase: iamguest Hexadecimal Digits: 12345abcde
Pre-shared Key	The Pre-shared key is used to authenticate and encrypt data transmitted between the bridged access points. Fill the text box by following the rules below. Hex WEP: input 64-digit Hex values (in the “A-F”, “a-f” and “0-9” range) or at least 8 character pass phrase as the pre-shared keys.

Click **Apply** button at the bottom of the screen to save the above configurations. You can now configure other advance sections or start using the Access Point.

Active Wireless Client Table

“Active Wireless Client Table” records the status of all active wireless stations that are connecting to the access point. You can lookup the MAC Address, Number of Transmitted Packets, Number of Received Packets and Encryption Status of each active wireless client in this table.



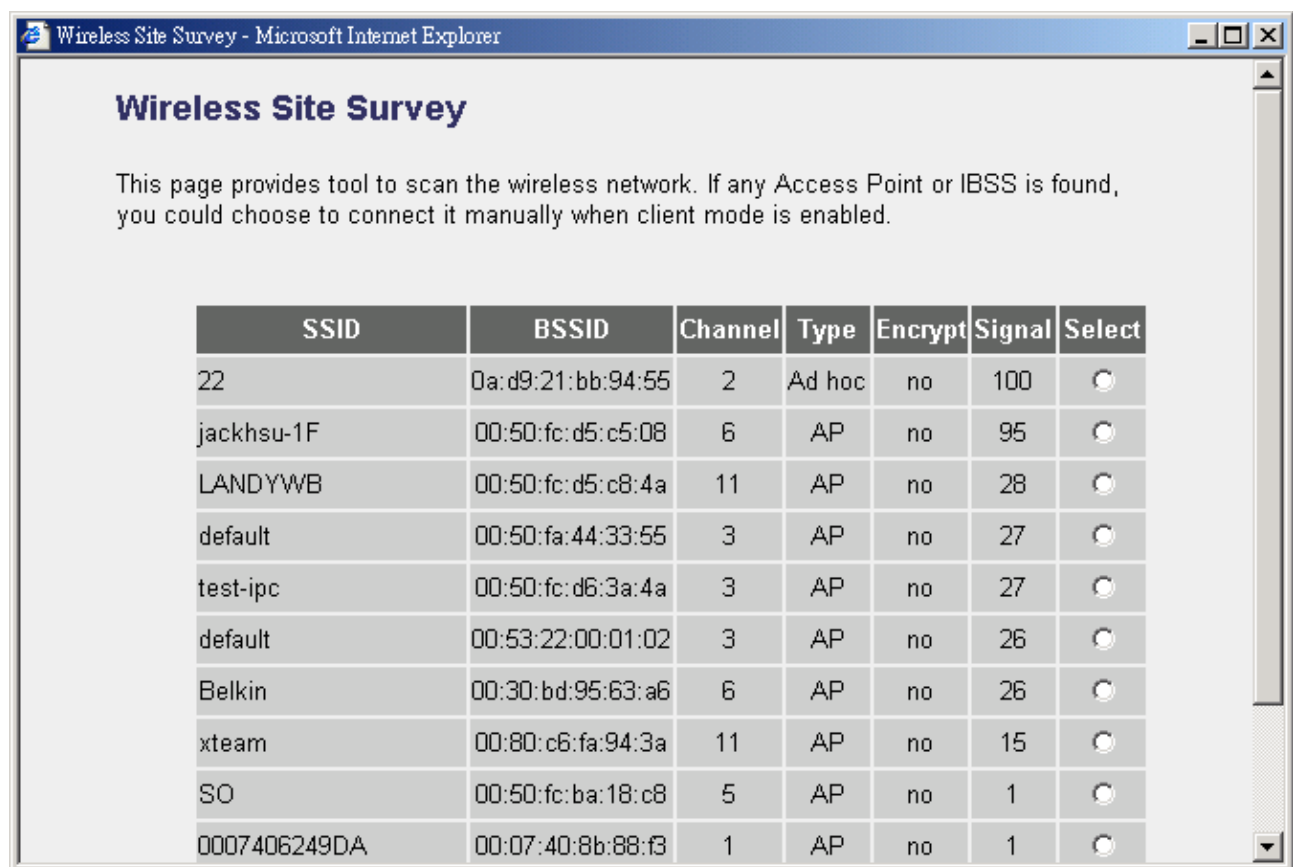
Parameter	Description
MAC Address	MAC address of this active wireless station.
Tx Packet	The number of transmitted packets that are sent out from this active wireless station.
Rx Packet	The number of received packets that are received by this active wireless station.
TX Rate	The transmission rate in Mbps.
Power Saving	Shows if the wireless client is in Power Saving mode.
Expired Time	The time in second before dissociation. If the wireless keeps idle long than the expired time, this access point will dissociate it. The wireless client station has to associate again when it become active.
Refresh	Refresh the "Active Wireless Client Table".

Close

Refresh the "Active Wireless Client Table".

Wireless Site Survey

When this access point is in "Station-Ad Hoc mode", "Station-Infrastructure mode" or "Universal Repeater mode", it should associate with an access point or station and connect to your wireless LAN through the associated access point or station. "Wireless Site Survey" searches for all available access points near by. You can select one access point listed in this table.



SSID	BSSID	Channel	Type	Encrypt	Signal	Select
22	0a:d9:21:bb:94:55	2	Ad hoc	no	100	☐
jackhsu-1F	00:50:fc:d5:c5:08	6	AP	no	95	☐
LANDYWB	00:50:fc:d5:c8:4a	11	AP	no	28	☐
default	00:50:fa:44:33:55	3	AP	no	27	☐
test-ipc	00:50:fc:d6:3a:4a	3	AP	no	27	☐
default	00:53:22:00:01:02	3	AP	no	26	☐
Belkin	00:30:bd:95:63:a6	6	AP	no	26	☐
xteam	00:80:c6:fa:94:3a	11	AP	no	15	☐
SO	00:50:fc:ba:18:c8	5	AP	no	1	☐
0007406249DA	00:07:40:8b:88:f3	1	AP	no	1	☐

3.2.3 Advanced Setting

You can set advanced parameters of this access point. The parameters include Authentication Type, Fragment Threshold, RTS Threshold, Beacon Interval, Tx Operation Rate, Tx Basic Rate, Preamble Type, Broadcast ESSID. You should not change these parameters unless you know what effect the changes will have on this access point.

Parameter	Description
Authentication Type	There are two authentication types: "Open System" and "Shared Key". When you select "Open System", wireless stations can associate with this access point without WEP encryption. When you select "Shared Key", you should also setup WEP key in the "Encryption" page and wireless stations should use WEP encryption in the authentication phase to associate with this access point. If you select "Auto", the wireless client can associate with this access point by using any one of these two authentication types.

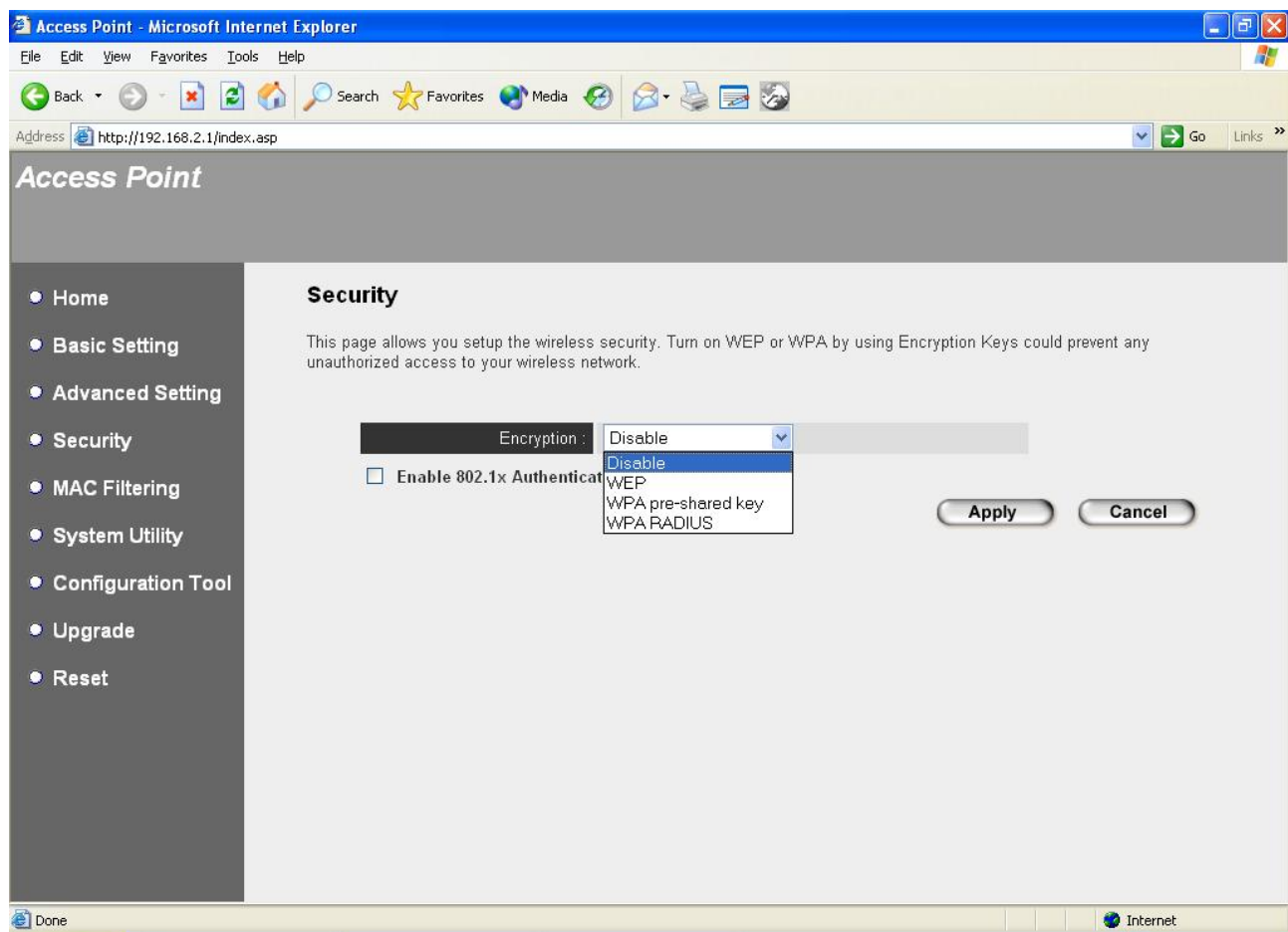
Fragment Threshold	"Fragment Threshold" specifies the maximum size of packet during the fragmentation of data to be transmitted. If you set this value too low, it will result in bad performance.
RTS Threshold	When the packet size is smaller than the RTS threshold, the access point will not use the RTS/CTS mechanism to send this packet.
Beacon Interval	The interval of time that this access point broadcast a beacon. Beacon is used to synchronize the wireless network.
Data Rate	The "Data Rate" is the rate this access point uses to transmit data packets. The access point will use the highest possible selected transmission rate to transmit the data packets.
Preamble Type	Preamble type defines the length of CRC block in the frames during the wireless communication. "Short Preamble" is suitable for high traffic wireless network. "Long Preamble" can provide more reliable communication.
Broadcast ESSID	If you enable "Broadcast ESSID", every wireless station located within the coverage of this access point can discover this access point easily. If you are building a public wireless network, enabling this feature is recommended. Disabling "Broadcast ESSID" can provide better security.
IAPP	If you enable "IAPP", the access point will automatically broadcast information of associated wireless stations to its neighbors. This will help wireless station roaming smoothly between access points. If you have more than one access points in your wireless LAN and wireless stations have roaming requirements, enabling this feature is recommended. Disabling "IAPP" can provide better security.
802.11g Protection	This is also called CTS Protection. It is recommended to enable the protection mechanism. This mechanism can decrease the rate of data collision between 802.11b and 802.11g wireless stations. When the protection mode is enabled, the throughput of the AP will be a little lower due to many of frame traffic should be transmitted.

Click **Apply** button at the bottom of the screen to save the above configurations. You can now configure other advance sections or start using the Access Point.

3.2.4 Security

This Access Point provides complete wireless LAN security functions, include WEP, IEEE 802.11x, IEEE 802.11x with WEP, WPA with pre-shared key and WPA with RADIUS. With these security functions, you can prevent your wireless LAN from illegal access. Please make sure your wireless stations use the same security function.

Note: This access point can act as station and AP at the same time in "Universal Repeater mode". The security settings only apply to AP function in "Universal Repeater mode". The station function of "Universal Repeater mode" does not have security feature.



WEP only

When you select 64-bit or 128-bit WEP key, you have to enter WEP keys to encrypt data. You can generate the key by yourself and enter it. You can enter four WEP keys and select one of them as default key. Then the access point can receive any packets encrypted by one of the four keys. You can use WEP encryption in "AP mode", "Station-Ad Hoc mode", "Station-Infrastructure mode", "AP Bridge-WDS mode" and "Universal Repeater mode".

Parameter	Description
Key Length	You can select the 64 or 128-bit key to encrypt transmitted data. Larger WEP key length will provide higher level of security, but the throughput will be lower.
Key Format	You may select to select ASCII Characters (alphanumeric format) or Hexadecimal Digits (in the “A-F”, “a-f” and “0-9” range) to be the WEP Key. For example: ASCII Characters: guest Hexadecimal Digits: 12345abcde
Default Tx Key	Select one of the four keys to encrypt your data. Only the key you select it in the “Default key” will take effect.
Key 1 - Key 4	The WEP keys are used to encrypt data transmitted in the wireless network. Fill the text box by following the rules below.

64-bit WEP: input 10-digit Hex values (in the “A-F”, “a-f” and “0-9” range) or 5-digit ASCII character as the encryption keys.

128-bit WEP: input 26-digit Hex values (in the “A-F”, “a-f” and “0-9” range) or 10-digit ASCII characters as the encryption keys.

Click **Apply** button at the bottom of the screen to save the above configurations. You can now configure other advance sections or start using the Access Point.

802.1x only

IEEE 802.1x is an authentication protocol. Every user must use a valid account to login to this Access Point before accessing the wireless LAN. The authentication is processed by a RADIUS server. This mode only authenticates user by IEEE 802.1x, but it does not encryption the data during communication. You can use 802.1x without encryption in “AP mode”, “AP Bridge-WDS mode” and “Universal Repeater mode”.

Parameter	Description
RADIUS Server IP address	The IP address of external RADIUS server.

RADIUS Server Port The service port of the external RADIUS server.

RADIUS Server Password The password used by external RADIUS server.

Click **Apply** button at the bottom of the screen to save the above configurations. You can now configure other advance sections or start using the Access Point.

802.1x WEP static key

IEEE 802.1x is an authentication protocol. Every user must use a valid account to login to this Access Point before accessing the wireless LAN. The authentication is processed by a RADIUS server. This mode also uses WEP to encrypt the data during communication. You can use 802.1x with WEP encryption in “AP mode”, “AP Bridge-WDS mode” and “Universal Repeater mode”.

The screenshot shows the 'Access Point' configuration web interface in Microsoft Internet Explorer. The browser address bar shows 'http://192.168.2.1/index.asp'. The page title is 'Access Point'. On the left is a navigation menu with links: Home, Basic Setting, Advanced Setting, Security, MAC Filtering, System Utility, Configuration Tool, Upgrade, and Reset. The main content area is titled 'Security' and contains the following fields:

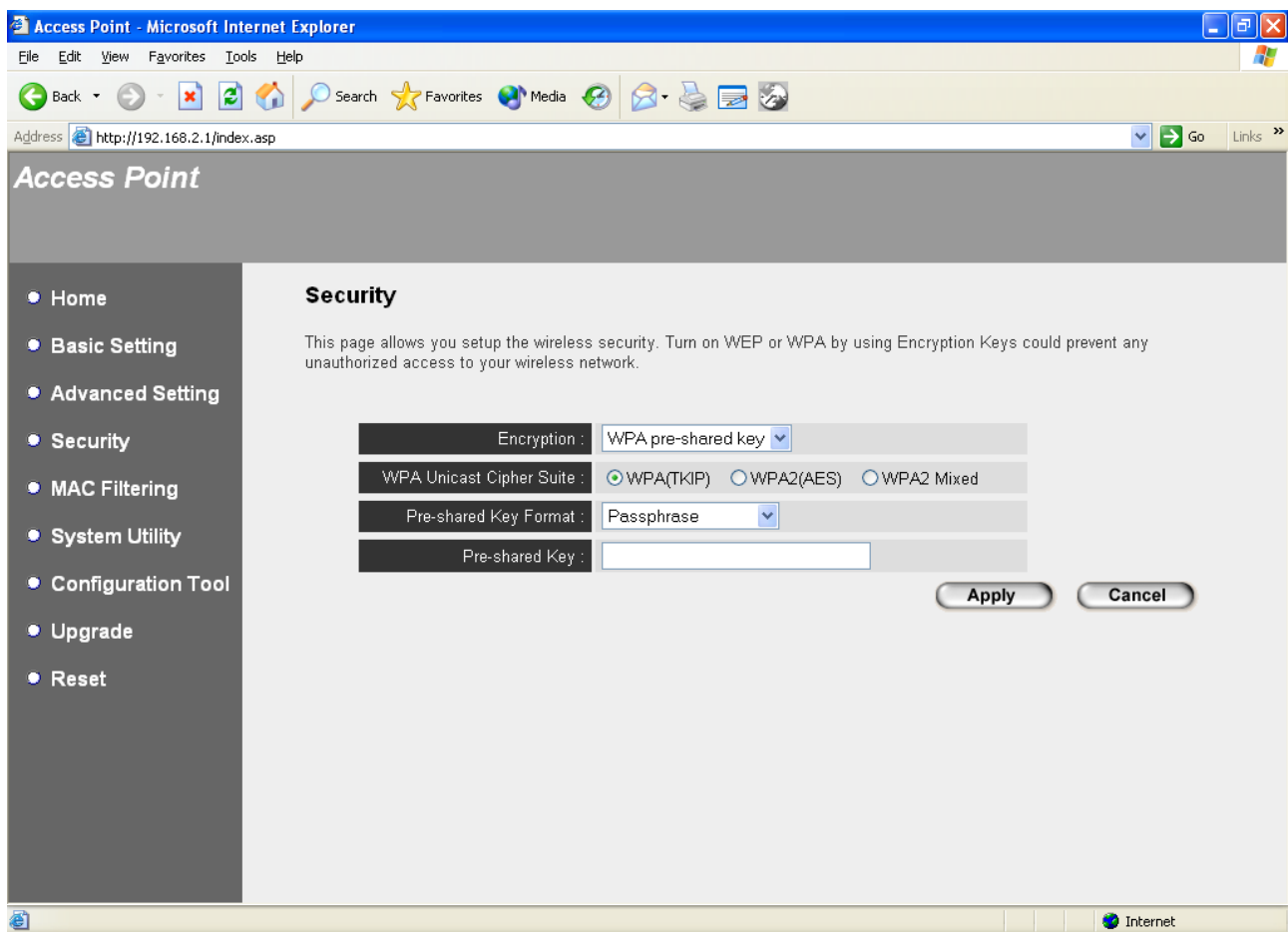
- Encryption: WEP (dropdown)
- Key Length: 64-bit (dropdown)
- Key Format: Hex (10 characters) (dropdown)
- Default Tx Key: Key 1 (dropdown)
- Encryption Key 1: [text input]
- Encryption Key 2: [text input]
- Encryption Key 3: [text input]
- Encryption Key 4: [text input]
- ☒ Enable 802.1x Authentication
- RADIUS Server IP address: [text input]
- RADIUS Server Port: 1812 (text input)
- RADIUS Server Password: [text input]

For the WEP settings, please refer to section “WEP only”. For the 802.1x settings, please refer to section “802.1x only”.

Click **Apply** button at the bottom of the screen to save the above configurations. You can now configure other advance sections or start using the Access Point.

WPA pre-shared key

Wi-Fi Protected Access (WPA) is an advanced security standard. You can use a pre-shared key to authenticate wireless stations and encrypt data during communication. It uses TKIP or CCMP(AES) to change the encryption key frequently. So the encryption key is not easy to be broken by hackers. This can improve security very much. You can use WPA pre-shared key encryption in “AP mode”, “Station-Ad Hoc mode”, “Station-Infrastructure mode”, “AP Bridge-WDS mode” and “Universal Repeater mode”.



Parameter	Description
WPA(TKIP)	TKIP can change the encryption key frequently to enhance the wireless LAN security.
WPA2(AES)	This use CCMP protocol to change encryption key frequently. AES can provide high level encryption to enhance the wireless LAN security.

WPA2 Mixed	This will use TKIP or AES based on the other communication peer automatically.
Pre-shared Key Format	You may select to select Passphrase (alphanumeric format) or Hexadecimal Digits (in the "A-F", "a-f" and "0-9" range) to be the Pre-shared Key. For example: Passphrase: iamguest Hexadecimal Digits: 12345abcde
Pre-shared Key	The Pre-shared key is used to authenticate and encrypt data transmitted in the wireless network. Fill the text box by following the rules below. Hex: input 64-digit Hex values (in the "A-F", "a-f" and "0-9" range) or at least 8 character pass phrase as the pre-shared keys.

Click **Apply** button at the bottom of the screen to save the above configurations. You can now configure other advance sections or start using the Access Point.

WPA RADIUS

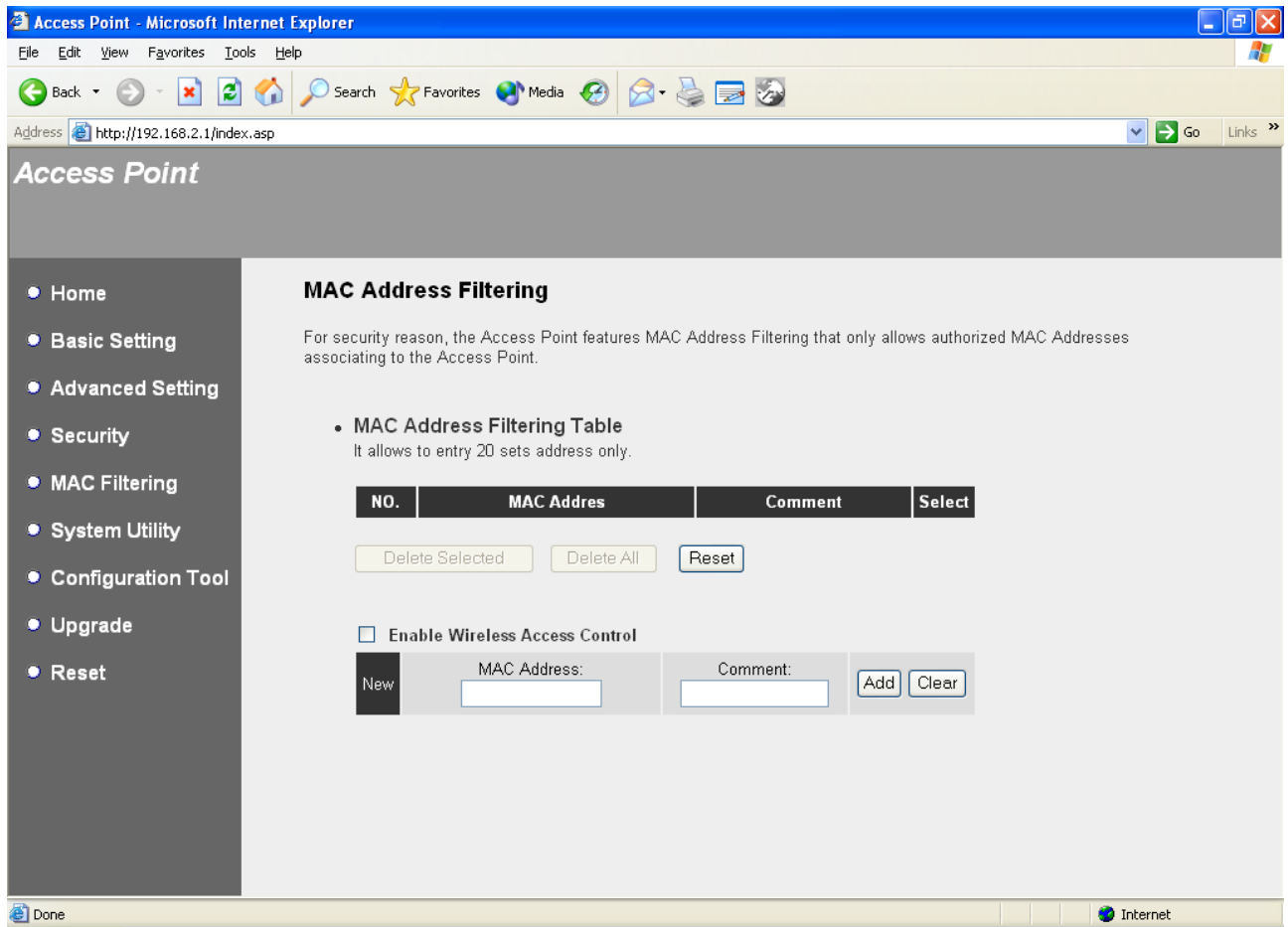
Wi-Fi Protected Access (WPA) is an advanced security standard. You can use an external RADIUS server to authenticate wireless stations and provide the session key to encrypt data during communication. It uses TKIP or CCMP(AES) to change the encryption key frequently. This can improve security very much. You can use WPA RADIUS encryption in "AP mode", "AP Bridge-WDS mode" and "Universal Repeater mode".

Parameter	Description
WPA(TKIP)	TKIP can change the encryption key frequently to enhance the wireless LAN security.
WPA2(AES)	This use CCMP protocol to change encryption key frequently. AES can provide high level encryption to enhance the wireless LAN security.
WPA2 Mixed	This will use TKIP or AES based on the other communication peer automatically.
RADIUS Server IP address	The IP address of external RADIUS server.
RADIUS Server Port	The service port of the external RADIUS server.
RADIUS Server Password	The password used by external RADIUS server.

Click **Apply** button at the bottom of the screen to save the above configurations. You can now configure other advance sections or start using the Access Point.

3.2.5 MAC Address Filtering

This Access Point provides MAC Address Filtering, which prevents the unauthorized MAC Addresses from accessing your wireless network.



Parameter	Description
Enable Wireless Access Control	Enable or disable the MAC Address Filtering function.
MAC Address Filtering Table	This table records the MAC addresses of wireless stations you want to allow to access your network. The "Comment" field is the description of the wireless station associated with the "MAC Address" and is helpful for you to recognize the wireless station.
Add MAC address into the table	In the bottom "New" area, fill in the "MAC Address" and "Comment" of the wireless station to be added and then click "Add". Then this wireless station will be added into the "MAC Address Filtering Table" above. If you

find any typo before adding it and want to retype again. Just click "Clear" and both "MAC Address" and "Comment" fields will be cleared.

Remove MAC address from the table If you want to remove some MAC address from the "MAC Address Filtering Table", select the MAC addresses you want to remove in the table and then click "Delete Selected". If you want remove all MAC addresses from the table, just click "Delete All" button.

Reset Click "Reset" will clear your current selections.

Click **Apply** button at the bottom of the screen to save the above configurations. You can now configure other advance sections or start using the Access Point.

3.2.6 System Utility

From here, you can define the Access Point's IP Address and Login Password and enable the Access Point to be a DHCP Server.

Parameter	Description
Current Password	Enter the current password (up to 15-digit alphanumeric string) of the Access Point. The default password for the Access Point is 1234 . Note that the password is case-sensitive.
New Password	Enter the password (up to 15-digit alphanumeric string) you want to login to the Access Point. Note that the password is case-sensitive.
Re-Enter Password	Reconfirm the password (up to 15-digit alphanumeric string) you want to login to the Access Point. Note that the password is case-sensitive.

IP Address	Designate the Access Point's IP Address. This IP Address should be unique in your network. The default IP Address is 192.168.2.1 .
Subnet Mask	Specify a Subnet Mask for your LAN segment. The Subnet Mask of the Access Point is fixed and the value is 255.255.255.0 .
Gateway Address	The IP address of the default gateway of the subnet that this access point resides in. It allows this access point be accessed by PC from deferent subnet to do configuration.
DHCP Server	Enable or disable the DHCP Server.

Click **Apply** button at the bottom of the screen to save the above configurations. You can now configure other advance sections or start using the Access Point.

DHCP Server Setting

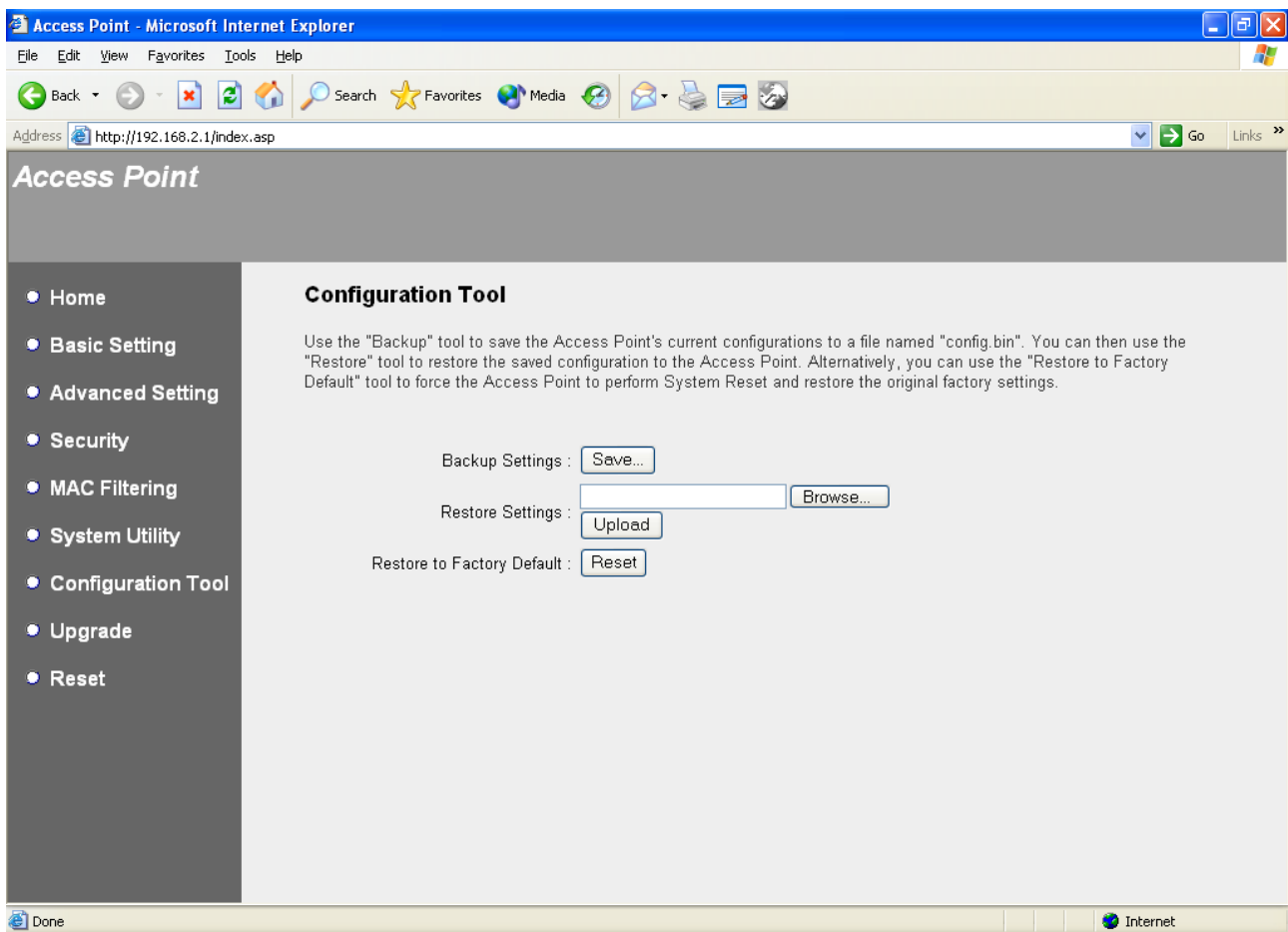
DHCP Server will automatically give your LAN client an IP address. If the DHCP is not enabled then you'll have to manually set your LAN client's IP address.

Parameter	Description
Default Gateway IP	Specify the gateway IP in your network. This IP address should be different from the Management IP.
Domain Name Server IP	This is the ISP's DNS server IP address that they gave you; or you can specify your own preferred DNS server IP address.
Start IP/End IP	You can designate a particular IP address range for your DHCP server to issue IP addresses to your LAN Clients. By default the IP range is from: Start IP 192.168.2.100 to End IP 192.168.2.200 .
Domain Name	You can specify the Domain Name for your Access Point.
Lease Time	The DHCP Server when enabled will temporarily give your LAN client an IP address. In the Lease Time setting you can specify the time period that the DHCP Server lends an IP address to your LAN clients. The DHCP Server will change your LAN client's IP address when this time threshold period is reached.

Click **Apply** button at the bottom of the screen to save the above configurations. You can now configure other advance sections or start using the Access Point.

3.2.7 Configuration Tool

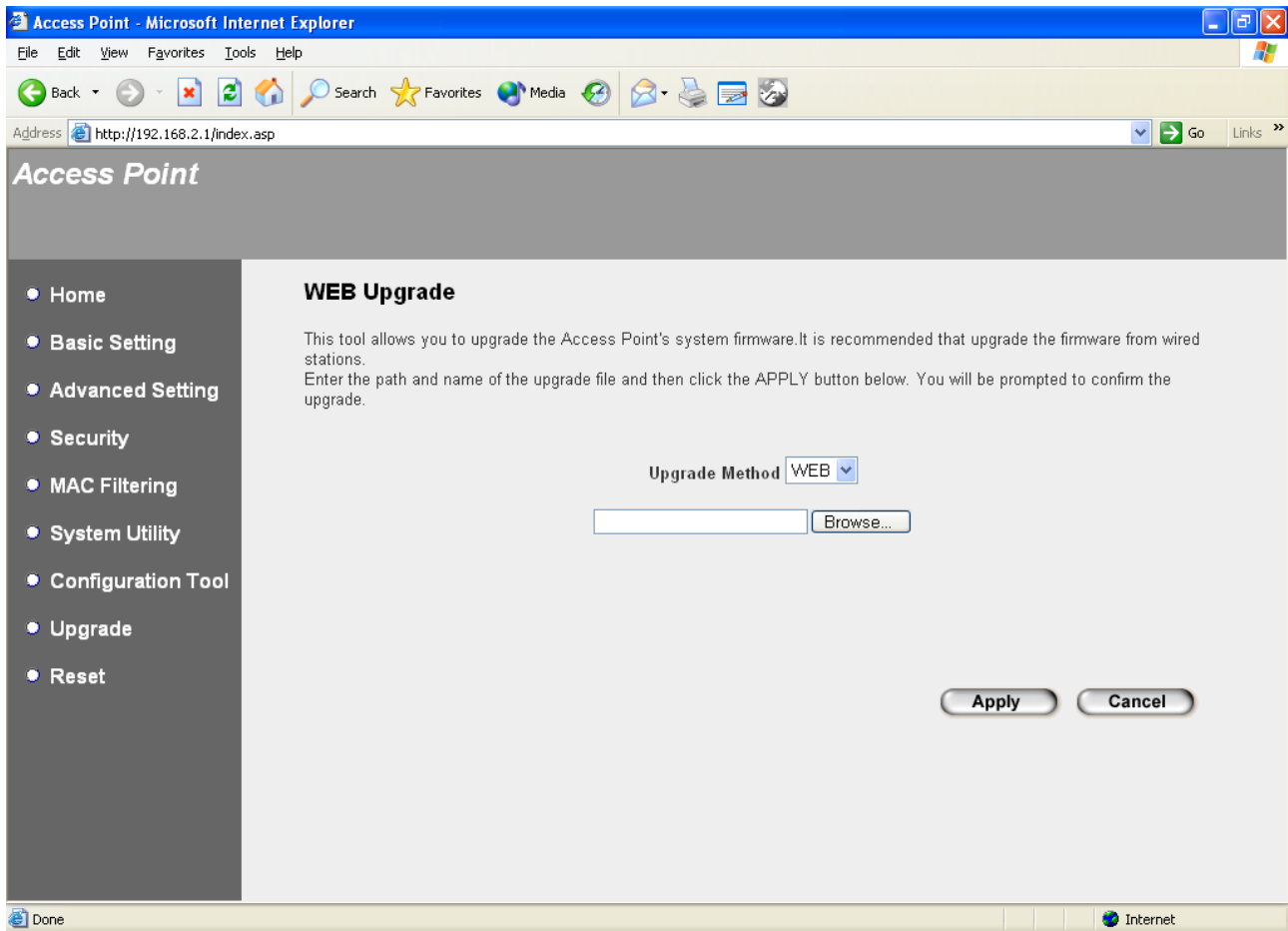
The Configuration Tools screen allows you to save (**Backup**) the Access Point's current configuration setting. Saving the configuration settings provides an added protection and convenience should problems occur with the Access Point and you have to reset to factory default. When you save the configuration setting (Backup) you can re-load the saved configuration into the Access Point through the **Restore** selection. If extreme problems occur you can use the **Restore to Factory Default** selection, this will set all configurations to its original default settings (e.g. when you first purchased the Access Point).



Parameter	Description
Configuration Tools	Use the "Backup" tool to save the Access Point's current configuration to a file named "config.bin" on your PC. You can then use the "Restore" tool to upload and restore the saved configuration to the Access Point. Alternatively, you can use the "Restore to Factory Default" tool to force the Access Point to perform a power reset and restore the original factory settings.

3.2.8 Firmware Upgrade

This page allows you to upgrade the Access Point's firmware.

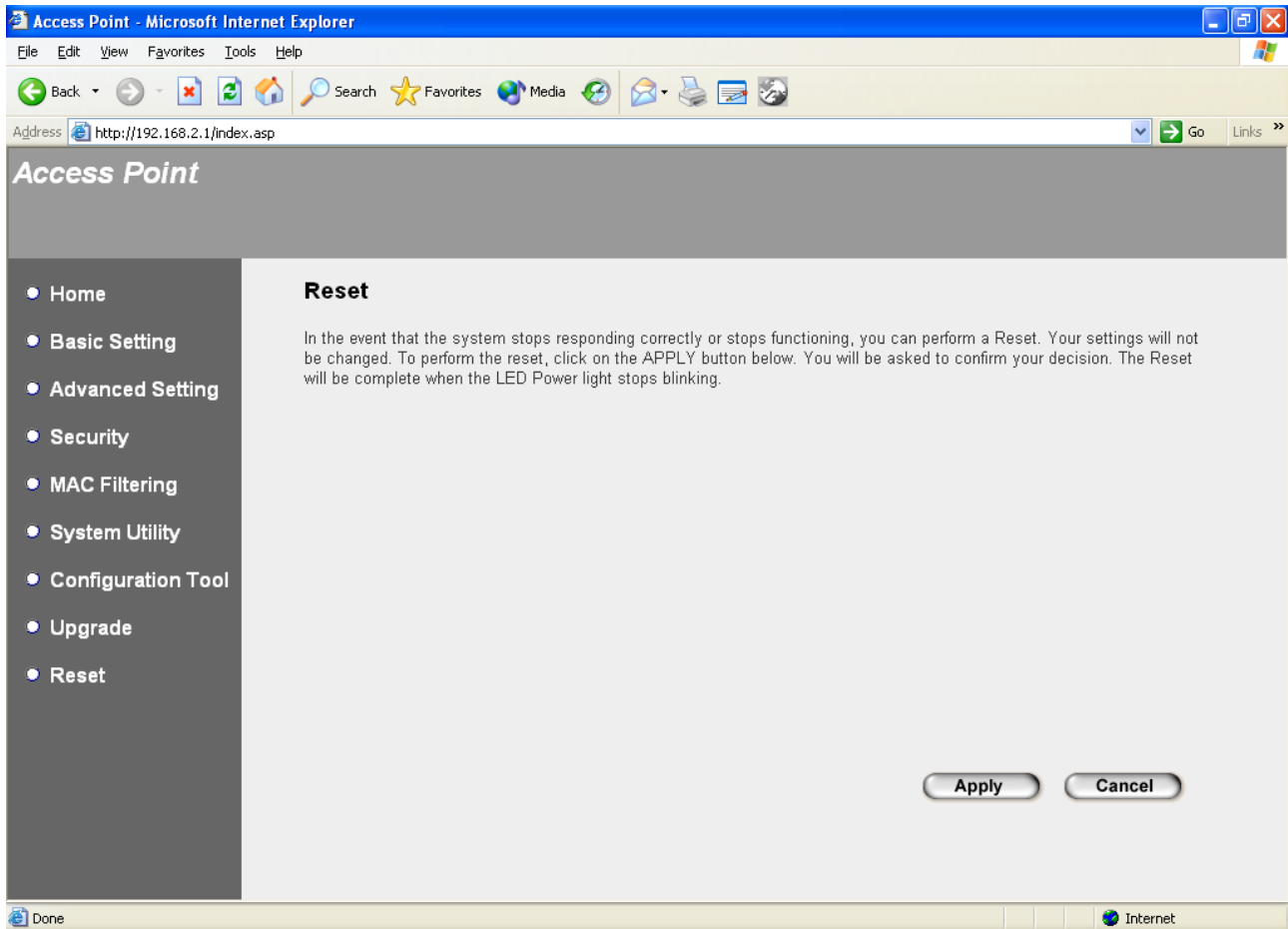


Parameter	Description
Firmware Upgrade	This tool allows you to upgrade the Access Point's system firmware. To upgrade the firmware of your Access Point, you need to download the firmware file to your local hard disk, and enter that file name and path in the appropriate field on this page. You can also use the Browse button to find the firmware file on your PC. Please reset the Access Point when the upgrade process is complete.

Once you've selected the new firmware file, click **Apply** button at the bottom of the screen to start the upgrade process. (You may have to wait a few minutes for the upgrade to complete). Once the upgrade is complete you can start using the Access Point.

3.2.9 Reset

You can reset the Access Point's system should any problem exist. The reset function essentially Re-boots your Access Point's system.



Parameter	Description
Reset	In the event that the system stops responding correctly or in some way stops functioning, you can perform a reset. Your settings will not be changed. To perform the reset, click on the Apply button. You will be asked to confirm your decision. Once the reset process is complete you may start using the Access Point again.

Chapter 4 Troubleshooting

This chapter provides solutions to problems usually encountered during the installation and operation of the Access Point.

1. How to manually find your PC's IP and MAC Address?

- 1) In Windows, open the Command Prompt program
- 2) Type **ipconfig /all** and **Enter**
 - Your PC's IP address is the one entitled **IP address**
 - Your PC's MAC Address is the one entitled **Physical Address**

2. What is Ad-hoc?

An Ad-hoc wireless LAN is a group of computers, each with a WLAN adapter, connected as an independent wireless LAN.

3. What is Infrastructure?

An integrated wireless and wired LAN is called an Infrastructure configuration.

4. What is BSS ID?

A group of wireless stations and an Access Point compose a Basic Service Set (BSS). Computers in a BSS must be configured with the same BSSID.

5. What is ESSID?

An Infrastructure configuration could also support roaming capability for mobile workers. More than one BSS can be configured as an Extended Service Set (ESS). Users within an ESS could roam freely between BSSs while maintaining a continuous connection to the wireless network stations and the Wireless LAN Access Points.

6. Can data be intercepted while transmitting through the air?

WLAN features two-fold protection in security. On the hardware side, as with Direct Sequence Spread Spectrum technology, it has the inherent scrambling security feature. On the software side, the WLAN series offers the encryption function (WEP, WPA, WPA2) to enhance security and access control.

7. What is WEP?

WEP stands for Wired Equivalent Privacy, a data privacy mechanism based on a 64(40)-bit shared key algorithm.

8. What is WPA?

WPA is an acronym for Wi-Fi Protected Access. It is a security protocol for 802.11 wireless networks. WPA can provide data protection with the use of encryption and the use of access controls and user authentication.

9. What is WPA2?

In addition to WPA, WPA2 provides a stronger encryption mechanism through Advanced Encryption Standard (AES).

10. What is a MAC Address?

The Media Access Control (MAC) address is a unique number assigned by the manufacturer to any Ethernet networking device, such as a network adapter, that allows the network to identify it at the hardware level. For all practical purposes, this number is usually permanent. Unlike IP addresses, which can change every time a computer logs on to the network, the MAC address of a device stays the same, making it a valuable identifier for the network.

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

IMPORTANT NOTE:

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.